SEQUENCE LISTING

<110> BACHMANN, Heinrich
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WIRTZ, Gabriele M
WOGGON, Wolf-Dietrich
WYSS, Adrian
WYSS, Markus

<120> BETA,BETA-CAROTENE 15,15'-DIOXYGENASES, NUCLEIC ACID SEQUENCES CODING THEREFOR AND THEIR USE

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His Trp Phe Asp Gly Leu Ala Leu Leu His Ser Phe Thr Phe Lys Asn
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Arg Lys Ile Asp Pro Gln Thr Leu Glu Thr Leu Asp Lys Val Asp Tyr
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Ser Lys Tyr Val Ala Val Asn Leu Ala Thr Ser His Pro His Tyr Asp
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Ser Ala Gly Asn Ile Leu Asn Met Gly Thr Ser Ile Val Asp Lys Gly
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Glu Lys Lys Lys Ser Cys Phe Lys His Leu Glu Val Val Cys Ser Ile
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Pro Ser Arg Ser Leu Leu Gln Pro Ser Tyr Tyr His Ser Phe Gly Ile
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Val Lys Leu Ala Thr Ala Tyr Ile Arg Gly Val Asn Trp Ala Ser Cys
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Leu Ser Phe His Lys Glu Asp Lys Thr Trp Phe His Phe Val Asp Arg
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Lys Thr Lys Lys Glu Val Ser Thr Lys Phe Tyr Thr Asp Ala Leu Val
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Leu Tyr His His Ile Asn Ala Tyr Glu Glu Asp Gly His Val Val Phe
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Gly Ile Glu Leu Pro Arg Val Asn Tyr Asp Tyr Asn Gly Lys Lys Tyr
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Lys Tyr Val Tyr Ala Thr Glu Val Gln Trp Ser Pro Val Pro Thr Lys
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Pro Asn Lys Ala Pro Phe Leu Leu Ile Leu Asp Ala Lys Thr Phe Lys
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35 40 45

His Ser Phe Thr Phe Lys Asn Gly Glu Val Tyr Tyr Arg Ser Lys Tyr
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Leu Arg Ser Asp Thr Tyr Asn Cys Asn Ile Glu Ala Asn Arg Ile Val
65 70 75 80

Val Ser Glu Phe Gly Thr Met Ala Tyr Pro Asp Pro Cys Lys Asn Ile
85 90 95

Phe Ala Lys Ala Phe Ser Tyr Leu Ser His Thr Ile Pro Glu Phe Thr
100 105 110

Asp Asn Cys Leu Ile Asn Ile Met Lys Thr Gly Asp Asp Tyr Tyr Ala
115 120 125

Thr Ser Glu Thr Asn Phe Ile Arg Lys Ile Asp Pro Gln Thr Leu Glu
130 135 140

Thr Leu Asp Lys Val Asp Tyr Ser Lys Tyr Val Ala Val Asn Leu Ala
145 150 155 160

Thr Ser His Pro His Tyr Asp Ser Ala Gly Asn Ile Leu Asn Met Gly
165 170 175

Thr Ser Ile Val Asp Lys Gly Arg Thr Lys Tyr Val Leu Phe Lys Ile
180 185 190

Pro Ser Ser Val Pro Glu Lys Glu Lys Lys Lys Ser Cys Phe Lys His
195 200 205

Leu Glu Val Val Cys Ser Ile Pro Ser Arg Ser Leu Leu Gln Pro Ser
210 215 220

Tyr Tyr His Ser Phe Gly Ile Thr Glu Asn Tyr Ile Val Phe Ile Glu
225 230 235 240

Gln Pro Phe Lys Leu Asp Ile Val Lys Leu Ala Thr Ala Tyr Ile Arg
245 250 255

Gly Val Asn Trp Ala Ser Cys Leu Ser Phe His Lys Glu Asp Lys Thr
260 265 270

Trp Phe His Phe Val Asp Arg Lys Thr Lys Lys Glu Val Ser Thr Lys
275 280 285

Phe Tyr Thr Asp Ala Leu Val Leu Tyr His His Ile Asn Ala Tyr Glu
290 295 300

Glu Asp Gly His Val Val Phe Asp Ile Val Ala Tyr Arg Asp Asn Ser
305 310 315 320

Leu Tyr Asp Met Phe Tyr Leu Lys Lys Leu Asp Lys Asp Phe Glu Val
325 330 335

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340 345 350

Leu Gln Tyr Asp Lys Asp Ala Glu Val Gly Ser Asn Leu Val Lys Leu
355 360 365

Pro Thr Ser Ala Thr Ala Val Lys Glu Lys Asp Gly Ser Ile Tyr Cys
370 375 380

Gln Pro Glu Ile Leu Cys Glu Gly Ile Glu Leu Pro Arg Val Asn Tyr
385 390 395 400

Asp Tyr Asn Gly Lys Lys Tyr Lys Tyr Val Tyr Ala Thr Glu Val Gln
405 410 415

Trp Ser Pro Val Pro Thr Lys Ile Ala Lys Leu Asn Val Gln Thr Lys
420 425 430

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Glu Val Leu His Trp Gly Glu Asp His Cys Trp Pro Ser Glu Pro Ile
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Phe Val Pro Ser Pro Asp Ala Arg Glu Glu Asp Glu Gly Val Val Leu
    450                 455                 460

Thr Cys Val Val Val Ser Glu Pro Asn Lys Ala Pro Phe Leu Leu Ile
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Phe Glu Val Gly Ser Glu Pro Phe Tyr His Leu Phe Asp Gly Gln Ala
         35                  40                  45

Leu Leu His Lys Phe Asp Phe Lys Glu Gly His Val Thr Tyr His Arg
     50                  55                  60

Arg Phe Ile Arg Thr Asp Ala Tyr Val Arg Ala Met Thr Glu Lys Arg
 65                  70                  75                  80

Ile Val Ile Thr Glu Phe Gly Phe Thr Thr Cys Ala Phe Pro Asp Pro
                85                  90                  95

Cys Lys Asn Ile Phe Ser Arg Phe Phe Ser Tyr Phe Arg Gly Val Glu
            100                 105                 110

Val Thr Asp Asn Ala Leu Val Asn Val Tyr Pro Val Gly Glu Asp Tyr
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Tyr Ala Cys Thr Glu Thr Asn Phe Ile Thr Lys Ile Asn Pro Glu Thr
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Leu Glu Thr Ile Phe Thr Lys Gln Val Asp Leu Cys Asn Tyr Val Ser
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Val Asn Gly Ala Thr Ala His Pro His Ile Glu Asn Asp Gly Thr Val
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Tyr Asn Ile Gly Asn Cys Phe Gly Lys Asn Phe Ser Ile Ala Tyr Asn
            180                 185                 190

Ile Val Lys Ile Pro Pro Leu Gln Ala Asp Lys Glu Asp Pro Ile Ser
        195                 200                 205

Lys Phe Thr Ser Glu Ile Val Val Gln Phe Pro Cys Ser Asp Arg Phe
    210                 215                 220

Lys Pro Ser Tyr Val His Ser Phe Gly Leu Thr Pro Asn Tyr Ile Val
225                 230                 235                 240

Phe Val Glu Thr Pro Val Lys Ile Asn Leu Phe Lys Phe Leu Ser Ser
                245                 250                 255

Trp Ser Leu Trp Gly Ala Asn Tyr Met Asp Cys Phe Glu Ser Phe Thr
            260                 265                 270

Asn Glu Thr Met Gly Val Trp Leu His Ile Ala Asp Lys Lys Arg Lys
        275                 280                 285

Lys Tyr Leu Asn Asn Lys Tyr Arg Thr Ser Pro Phe Asn Leu Phe His
    290                 295                 300

His Ile Asn Thr Tyr Glu Asp Asn Gly Phe Leu Ile Val Asp Leu Cys
305                 310                 315                 320

Cys Trp Lys Gly Phe Glu Phe Val Tyr Asn Tyr Phe Thr Leu Tyr Leu
                325                 330                 335

Ala Asn Leu Arg Glu Asn Trp Glu Glu Val Lys Lys Asn Ala Arg Lys
            340                 345                 350

Ala Pro Gln Pro Glu Val Arg Arg Tyr Val Leu Pro Leu Asn Ile Asp
        355                 360                 365

Lys Ala Asp Thr Gly Lys Asn Leu Val Thr Leu Pro Asn Thr Thr Ala
    370                 375                 380

Thr Ala Ile Leu Cys Ser Asp Glu Phe Thr Thr Ile Trp Leu Glu Pro
385                 390                 395                 400
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Glu Val Leu Phe Ser Gly Pro Arg Gln Ala Phe Glu Phe Pro Gln Ile
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Asn Tyr Gln Lys Tyr Cys Gly Lys Pro Tyr Thr Tyr Ala Tyr Gly Leu
            420                 425                 430

Gly Leu Asn His Phe Val Pro Asp Arg Leu Cys Lys Leu Asn Val Lys
        435                 440                 445

Thr Lys Glu Thr Trp Phe Thr Val Trp Gln Glu Pro Asp Ser Tyr Pro
    450                 455                 460

Ser Glu Pro Ile Phe Val Ser His Pro Asp Ala Leu Glu Glu Asp Asp
465                 470                 475                 480

Gly Val Val Leu Ser Val Val Val Ser Pro Gly Ala Gly Gln Lys Pro
                485                 490                 495

Ala Tyr Leu Leu Ile Leu Asn Ala Lys Asp Leu Ser Glu Val Ala Arg
            500                 505                 510

Ala Glu Phe Thr Val Glu Ile Asn Ile Pro Val Thr Phe His Gly Leu
        515                 520                 525

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Leu Pro
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Leu Pro

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